

Remarks

Amendments To Specification

The "Cross Reference To Related Applications" has been amended to add a patent number for the issued parent case, and to cite a related division. In addition, an IDS with the issued parent case is being filed concurrently with this Amendment. Further, the title has been amended to be more descriptive of the claimed subject matter.

Rejections Under 35 USC §112, second paragraph

Claims 52-62 and 70-77 have been rejected under 35 USC §112, second paragraph, as being indefinite. These rejections are based on limitations in claims 52, 56, 60 and 70. These rejections are traversed. However, the claims have been amended to either delete, or make the objectionable limitations clearer.

Under the case law it is not the role of the claims to enable the invention, but rather to define the legal metes and bounds of the invention, In re Rainer, 305 F.2d 505, 134 USPQ 343 (CCPA 1962); In re Anderson, 471 F.2d 1237, 176 USPQ 331 (CCPA 1973); In re Mercier, 515 F.2d 1161, 185 USPQ 774 (CCPA 1975).

In addition, an applicant is permitted a great amount of latitude in formulating claims which define the invention, In re Duva, 387 F.2d 402, 156 USPQ 90 (CCPA 1968). Further, an applicant can use either conventional terms, or can be a lexicographer, as long as the meaning is clear, In re Castaing, 429 F.2d 461, 166 USPQ 550 (CCPA 1970).

a) With respect to the limitation "a metal layer on the substrate comprising a plurality of separate patterns of conductors on the components":

A metal redistribution layer 20 is shown in Figure 2C, and is described in the specification. As stated in the "Detailed Description" at page 10, lines 14-21 of the specification: "a metal redistribution layer 20 is blanket deposited on the surface of the substrate and on the component contacts 28 (Figure 3A) The redistribution layer 20 will be subsequently patterned to form patterns of conductors 22 (Figure 2F) on the components 12."

As stated in the "Summary of the Invention" at page 5, lines 5-7 of the specification: "Development of the exposed radiant sensitive film forms a mask that can be used to etch the pattern of conductors on each component."

Applicant submits that the specification and drawings make it clear that the metal redistribution layer 20 (Figure 2C) is both "on" the substrate 10 (Figure 2C), and "on" the components 12 (Figure 2C). In addition, it is clear that the metal redistribution layer 20 (Figure 3A) is "on" the component contacts 28 (Figure 3A), is separate from the component contacts 28 (Figure 3A), and is separate from the integrated circuits 56 (Figure 7B).

Note also Figure 7B wherein component contacts in the form of bond pads 58 are separate from the conductors 22P formed by the metal redistribution layer 20, and separate from the integrated circuits 56. In addition, it is stated on page 16, lines 28-31 of the specification: "As shown in Figure 7B, the package also includes a plurality of conductors 22P configured to electrically connect the bond pads 58 on the die 54 and the terminal contacts 64 on the package 52." Applicant further submits that it is clear that the conductors 22P are in electrical communication with the bond pads 58 (component contacts).

b) With respect to the limitation "a metal layer . . . in electrical communication with the component contacts configured to redistribute the component contacts on each component":

Applicant submits that it is clear from the specification and drawings that the metal redistribution layer 20 (Figure 2C), and the conductors 22 (Figure 2F) or 22P (Figure 3B), perform a redistribution function for the component contacts 28 (Figure 3A). As stated on page 5, lines 11-13 of the specification: "The conductors are configured to "fan out", or otherwise locate, terminal contacts for the components in a required pattern, such as a grid array." As stated on page 10, lines 25-27 of the specification: "Redistribution layers are well known in the art of semiconductor manufacture for configuring different types of components."

c) With respect to the limitation "the separate patterns of conductors containing information", this limitation has been removed from the amended claims.

d) With respect to the limitation "to repair the defective component by connecting selected component contacts on the defective component with selected integrated circuits on the defective component":

Applicant submits that the stated function of the conductors is clear from the description on page 13, lines 30-32 of the specification which states: "Some defects can be corrected by providing conductors 22 that substitute redundant circuitry contained on the defective components 12D for defective circuitry."

Rejections Under 35 USC §102

Claims 52-62 and 70-77 have been rejected under 35 USC §102(b) as being anticipated by Hsuan et al. (US Patent No. 6,214,630).

The rejections under 35 USC §102 are traversed for the reasons to follow.

Argument

The present component includes a substrate 10 having a plurality of components 12. In addition, each component 12 includes conductors 22 (Figure 2F) configured to perform the dual function of redistributing component contacts 28 (Figure 4) on the good components 22, and of either repairing, reconfiguring, or electrically isolating defective components 12D (Figure 4).

It is submitted that the presently claimed structure and function of the conductors 22 is not disclosed or suggested by Hsuan et al., or by the prior art in general. In this regard, the conductors 22 in the present claims have a pattern which corresponds to digital data generated during a test process. The conductors 22 are thus custom made to improve the function and yield of the components 12 on the substrate 10. For example, with a defective component 12D (Figure 4) the conductors 22 can have a pattern that either repairs, reconfigures or isolates the defective component 12D (Figure 4).

The concept of custom made conductors having a digital data pattern derived from a testing process is not taught or suggested by the prior art. In particular, the prior art teaches programmable elements such as fuses or antifuses, to configure conductors to accommodate defective

components. The present component does not require programmable elements which can be expensive, complicated and unreliable. Further, the present component does not require a separate activation step for the programmable elements.

For example, Hsuan et al. teaches at column 5, lines 21-25: "The IC components 104, 104a are further connected to a first set of fuses 118, which can be melt down to disconnect the associated IC components 104, 104a from active use if the associated IC components 104, 104a are inoperative."

Hsuan further teaches at column 6, lines 49-52: "The next step 80 is a second repair process, in which each inoperative IC block, if any, is disconnected from active use by using laser means to melt away the associated one of the second set of fuses 136."

Each of the independent claims has been amended to emphasize that the presently claimed component includes custom made conductors having a digital data pattern derived from a testing process. For example, amended independent claim 52 states: "the components including at least one defective component identified during a component testing process in which digital data represents locations of the components, the defective component and the component contacts". In addition, amended independent claim 52 states: "the conductors having a pattern corresponding to the digital data". Amended independent claims 56, 60 and 70 include similar recitations.

Antecedent basis for the added recitations is contained on page 12, lines 3-5 of the specification which states:

"The digital data 36 represents a selected pattern that will be "written" or "laser imaged" on the radiant sensitive film 24." (underlines added)

In addition, the specification states at page 12, lines 22-26:

"The modulated, reflected and focused laser beam 46 exposes the radiant sensitive film 24 such that following a subsequent development step, the desired pattern is contained on the radiant sensitive film.

As shown in Figure 2F, following exposure and development, the radiant sensitive film 24 forms a mask 25 that can be used to etch the redistribution layer 20 with the pattern of conductors 22." (underlines added)

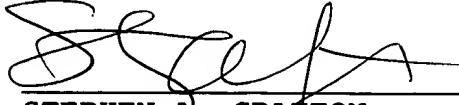
The added recitations taken in combination with the other elements of the claims define a component which is both novel and unobvious over the prior art.

Conclusion

In view of the amendments and arguments, favorable consideration and allowance of claims 52-62 and 70-77 is respectfully requested. Should any issues arise that will advance this case to allowance, the Examiner is asked to contact the undersigned by telephone.

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